

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
12 September 2008 (12.09.2008)

PCT

(10) International Publication Number  
**WO 2008/109644 A3**

(51) International Patent Classification:

G03B 15/03 (2006.01)

(21) International Application Number:

PCT/US2008/055864

(22) International Filing Date: 5 March 2008 (05.03.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/892,884 5 March 2007 (05.03.2007) US

(63) Related by continuation (CON) or continuation-in-part (CIP) to earlier applications:

US 11/282,954 (CIP)

Filed on 18 November 2005 (18.11.2005)

US 11/462,035 (CIP)

Filed on 2 August 2006 (02.08.2006)

(71) Applicant (for all designated States except US): **FOTO-NATION VISION LIMITED** [IE/IE]; Galway Business Park, Dangan, Galway (IE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **PRILUTSKY, Yury** [US/US]; 1426 Shoal Drive, San Mateo, CA 94404 (US). **POSOSIN, Alexei** [MD/IE]; 28 Arus Na Tra, Cois Cuain, Dr. Colahan's Rd, Galway (IE). **CIUC, Mihai** [RO/RO]; Str. Serg. Latea Gheorghe, Nr. 17, Sc. 1, Et. 7, Ap. 45, Sector 6, Bucharest (RO). **BIGIOI, Petronel** [RO/IE]; 57 Sceilg Ard., Headford Rd., Galway (IE). **STEINBERG, Eran** [IL/US]; 137 Granville Way, San Francisco, CA 94127 (US). **CORCORAN, Peter** [IE/IE]; Cregg, Claregalway, Co., Galway (IE).

(74) Agent: **SMITH, Andrew, V.**; 800 Airport Blvd., Suite 522, Burlingame, CA 94010 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN,

[Continued on next page]

(54) Title: TWO STAGE DETECTION FOR PHOTOGRAPHIC EYE ARTIFACTS

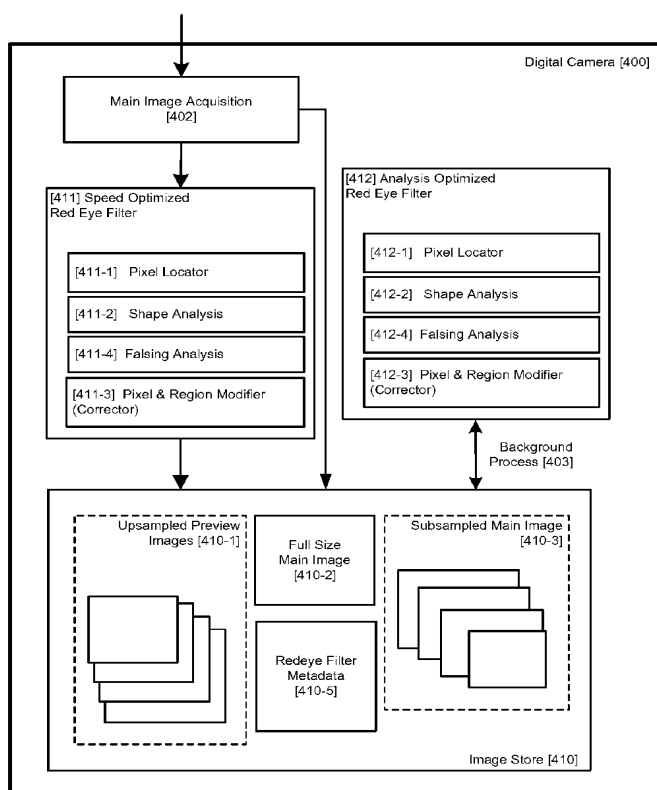


Figure 2(a)

(57) Abstract: The detection of red-eye defects is enhanced in digital images for embedded image acquisition and processing systems. A two-stage redeye filtering system includes a speed optimized filter that performs initial segmentation of candidate redeye regions and optionally applies a speed-optimized set of falsing/verification filters to determine a first set of confirmed redeye regions for correction. Some of the candidate regions which are rejected during the first stage are recorded and re-analyzed during a second stage by an alternative set of analysis-optimized filters to determine a second set of confirmed redeye regions.



MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US (patent), UZ, VC, VN, ZA, ZM, ZW.

FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**(84) Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,

**Published:**

— *with international search report*

**(88) Date of publication of the international search report:**  
23 October 2008

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 08/55864

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - G03B 15/03 (2008.04)

USPC - 396/158

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC(8) - G03B 15/03 (2008.04)

USPC - 396/158

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
348/333.02, 333.12; 396/18, 287, 296; 382/117, 164, 275; 345/593, 618

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
WEST (US Patents, US Pre-grant Publications, EPO Abstracts, JPO Abstracts); Googal Scholar - computer, digital, pixel, digitize, camera, picture, photo, image, photography, red eye, correct, fix, amend, adjust, verify, confirm, validate, falsing, speed, fast, quick, swift, rapid, two step, two stage, two part

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/0276481 A1 (ENOMOTO) 15 December 2005 (15.12.2005), fig 1-3; para [0002], [0009]-[0042], [0052]-[0059], [0069]-[0074], [0099]-[0105].	1-31
A	US 2006/0204052 A1 (YOKOUCHI) 14 September 2006 (14.09.2006), abstract; fig 1, 16.	1, 6, 12, 17, 23, 28



Further documents are listed in the continuation of Box C.



\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

21 July 2008 (21.07.2008)

Date of mailing of the international search report

30 JUL 2008

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents  
P.O. Box 1450, Alexandria, Virginia 22313-1450  
Facsimile No. 571-273-3201

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4300  
PCT OSP: 571-272-7774